

CLAIMS

1. A method for manufacturing a micro needle array, comprising the steps of:
  - preparing an X-ray mask by forming an absorber having a configuration of the micro needle array on a substrate;
  - preparing a PMMA cast for the micro needle array by exposing PMMA to vertical and inclined X-rays using the X-ray mask;
  - preparing a flexible PDMS mold having a configuration opposite to that of the PMMA cast by pouring PDMS on the PMMA cast;
  - filling an upper surface of the PDMS mold with a gel type of polymer to obtain a desired thickness of the polymer;
  - patterning a desired configuration of a hole by irradiating UV rays on the polymer; and
  - separating the PDMS mold to complete the polymer micro needle array.
- 15 2. The method according to claim 1, wherein the step of preparing the X-ray mask having the configuration of the micro needle array comprises the steps of:
  - forming an insulating layer by forming an oxide layer ( $\text{SiO}_2$ ) on the substrate;
  - forming a base substrate for electroforming by depositing a Cr/Au metal layer on the insulating layer;
  - patterning the configuration of the micro needle array using a photosensitive polymer, a developer and an etchant; and
  - forming the X-ray absorber by electroforming an Au layer using the patterned photosensitive polymer and removing the patterned photosensitive polymer.
- 25 3. The method according to claim 2, wherein the substrate comprises a silicon substrate, a boron nitride (BN) substrate, or a substrate with a low stress nitride layer.